CLAIMS

1. A method for the separation of particles (20, 21, 22) in a compartment (30) of a fluidic microsystem (100), with the steps:
- movement of a liquid (10) in which particles (20, 21, 22) are suspended with a predetermined direction of flow through the compartment (30), and
- generation of a deflecting potential in which at least a part of the particles (20, 21, 22) is moved relative to the liquid in a direction of deflection,
characterized by the further steps:
- generation of at least one focusing potential, so that at least a part of the particles is moved opposite to the direction of deflection relative to the liquid by dielectrophoresis under the effect of high-frequency electrical fields, and
- guiding of particles with different electrical, magnetic or geometric properties into different flow areas (11, 12) in the liquid.

2. The method according to claim 1, in which the direction of deflection deviates from the direction of flow and comprises a component transversely to the direction of flow.

3. The method according to claim 2, in which the direction of deflection runs perpendicularly to the direction of flow toward at least one of lateral walls of the compartment, the deflecting potential is generated by electrical, magnetic, optical, thermal and/or mechanical forces, and the flow areas comprise flow paths (11, 12) corresponding to different potential minima that are formed for the particular particles by the superposing of the deflecting and focusing potentials during the passage through the compartment in the temporal average.

4. The method according to claim 3, in which the deflecting potential is formed by a direct voltage field under whose action the particles are drawn by electrophoresis to at least one of the lateral walls of the compartment (30).

5. The method according to claim 4, in which the particles comprise biological cells of which at least a part is lysed under the action of the direct voltage field.

6. The method according to claim 3, in which the liquid (10) comprises a suspension of biological material containing biological cells and cell components and whereby a separation of the cells from the cell components takes place under the action of the direct voltage field.

7. The method according to claim 4, wherein electrodes (40) are arranged on walls (31-34) of the compartment (30), which electrodes are loaded with electrical fields for generating the dielectrophoresis and the electrophoresis.

8. The method according to at least one of the preceding claims, in which the deflecting and focusing potentials are generated alternating in time in at least one section of the compartment (30) or geometrically alternating in different successive sections of the compartment (30).

9. The method according to preceding claims 5 and 6, in which the electrical fields comprise high-frequency alternating voltage components and direct voltage components generated simultaneously or alternately.

10. The method according to claim 7, in which a plurality of focusing potentials is generated with an electrode array (43.1

to 43.11) between the two electrodes (41, 42) and in which the particles are guided onto the different flow paths (11, 12) in accordance with their electrical or geometric properties.

11. The method according to at least one of the preceding claims 2 to 9, in which the particles (20, 21, 22) are guided onto at least two separate flow paths (11, 12).

12. The method according to claim 11, in which the at least two flow paths (11, 12) empty into other, separate compartments (35, 36) of the microsystem (100).

13. The method according to claim 12, in which the at least two flow paths (11, 12) empty into separate compartments (35, 36) of the microsystem (100) separated by compartment walls or electric barriers (60).

14. The method according to claim 1, in which the direction of deflection runs parallel to the direction of flow and several focusing potentials are generated that are asymmetrically modulated in parallel with the direction of deflection and in which the particles run through the deflecting potential at different speeds.

15. The method according to at least one of the preceding claims, in which the particles (20, 21, 22) flow in front of the electrodes on a dielectrophoretic or hydrodynamic sequencing element (50).

16. The method according to at least one of the preceding claims, in which a pH gradient is generated in the channel (30).

17. The method according to claim 16, in which the pH gradient is generated by electrical direct voltage fields provided for the electrophoretic separation of the particles.

18. The method according to at least one of the preceding claims, in which a detection of the particles takes place after the guiding of the particles onto the different flow paths (11, 12).

19. The method according to at least one of the preceding claims, in which the deflecting and the focusing potentials are formed by several superposed alternating voltages with different frequencies.

20. The method according to at least one of the preceding claims, in which at least two deflecting potentials with different directions of deflection are generated.

21. A fluidic microsystem with:
- at least one compartment (30), through which a liquid with particles (20, 21, 22) flows through in a predetermined direction of flow, and
- a first separating device for generating a deflecting potential in which the particles (20, 21, 22) are moved in a direction of deflection,
characterized by
- a second separating device with electrodes (40) for generating at least one focusing potential so that the particles are moved by dielectrophoresis opposite to the direction of deflection.

22. The microsystem according to claim 21, in which the direction of deflection deviates from the direction of flow.

23. The microsystem according to claim 21 or 22, in which the first separating device is arranged for generating electrical, magnetic, optical and/or mechanical forces.

24. The microsystem according to claim 23, in which the first separating device comprises electrophoresis electrodes, a magnetic field device, a laser or an ultrasound source.

25. The microsystem according to at least one of the preceding claims 21 to 24, in which the first and the second separating devices are arranged separately in different, successive sections of the compartment (30).

26. The microsystem according to claim 21, 23 or 25, in which the first and the second separating devices form a common deflection unit comprising the electrodes (40).

27. The microsystem according to claim 26, in which the deflection unit can be alternately controlled in time with alternating and direct voltages.

28. The microsystem according to claim 24, in which an electrode array (43.1 to 43.11) consisting of electrode strips is arranged between the electrophoretic electrodes (41, 42), which strips can be controlled individually with high-frequency alternating voltages.

29. The microsystem according to claim 21, in which the direction of deflection runs parallel to the direction of flow.

30. The microsystem according to at least one of the preceding claims 21 to 29, in which the electrodes (40) are arranged on inner sides of the walls of the compartment (30).

31. The microsystem according to at least one of the preceding claims 21 to 30, in which the compartment (30) empties into separate compartments (36, 36) of the microsystem (100).

32. The microsystem according to claim 31, in which the compartments (35, 36) of the microsystem (100) are separated by compartment walls or electrical barriers (60).

33. The microsystem according to at least one of the preceding claims 21 to 32, in which a dielectrophoretic or hydrodynamic aligning element (50) is arranged in front of the separating devices.